

**KËRKESË**  
**Nr. 345, datë 22.1.2020**

**PËR SHPREHJE INTERESI, PËR SHËRBIMIN E KONSULENCËS LOKALE,  
“TRAJNIMI I INSPEKTORËVE SOCIALE PËR METODOLOGJINË E  
PËRMIRËSUAR TË INSPEKTIMIT TË PAK-së DHE ZHVILLIMIN E  
SPECIFIKIMEVE TEKNIKE PËR MODULIN SHITESË TË MIS-së SË PAK-së”,  
PËRFITUES I SË CILËS ËSHTË MINISTRIA E SHËNDETËSISË DHE MBROJTJES  
SOCIALE**

Tirana, January 20, 2020

**REQUEST FOR EXPRESSION OF INTEREST  
CONSULTING SERVICES  
FOR**

**“TA for training of social inspectors on improved DA inspection methodology and  
designing of technical specifications for additional module of DA MIS”**

**- Ref. no. SAMP/CS/CQ/10-2019**

*Albania*

*Social Assistance Modernization Project - (SAMP)*

*Loan No.: 8841- AL*

*Project ID No. P162079*

The Republic of Albania, has received financing (additional) from the World Bank toward the cost of the additional financing of the Social Assistance Modernization Project (SAMP), and intends to apply part of the proceeds for consultant services. The consulting services (“the Services”) include “training of social inspectors on improved DA inspection methodology and designing of technical specifications for additional module of DA MIS”.

The consulting services (“the Services”) include:

i. Refining the methodology of controlling the bio-psycho-social assessment of disability with concrete elements in order the methodology to be a useful instrument that can be afterwards transformed into the DA MIS module, and (ii) training of the social inspectors on the improved methodology;

ii. Developing the System Requirements Specifications (SRS) for two modules: Social inspection and case management modules which will be used as the primary guideline for the subsequent design and implementation of Stage-2 MIS software system, under a separate consulting effort.

The detailed Terms of Reference (TOR) for the assignment are attached to this request for expressions of interest.

The Ministry of Health and Social Protection, through the Project Management Team (PMT) now invites eligible local companies (“Consultants”) to indicate their interest in providing the Services. Interested Consultants should provide information demonstrating that the company has the required qualifications and relevant experience to perform the Services.

The short listing criteria are:

i. At least 8 years of proven experience in the field of System Development Lifecycle with heavy emphasis on development of Software Requirements Specifications for large Management Information Systems and - experience of information systems engineering with analysis, design and implementation of MISs for large enterprises (40 points);

- ii. The consultant must provide description of most relevant and similar work/assignments/contract, demonstrating appropriate skills in the above mentioned activities, under (i), in the last three years (*name of contract, client, duration, budget, source of funding*) (40 points);
- iii. The consultant must provide description of most relevant and similar work/assignments/contract demonstrating familiarity with social protection programs and solid base understanding of procedural, institutional and social development in general (10 points);
- iv. Availability of qualified key staff within the company (10 points).

The attention of interested Consultants is drawn to Section III, paragraphs, 3.14, 3.16, and 3.17 of the World Bank's "Procurement Regulations for IPF Borrowers", date July 2016 ("Procurement Regulations"), setting forth the World Bank's policy on conflict of interest.

Consultants may associate with other firms to enhance their qualifications, but should indicate clearly whether the association is in the form of a joint venture and/or a sub-consultancy. In the case of a joint venture, all the partners in the joint venture shall be jointly and severally liable for the entire contract, if selected.

A Consultant will be selected in accordance with the **Consultant's Qualifications Based Selection (CQS)** method set out in the Procurement Regulations.

Further information can be obtained at the address below during office hours 08:00 to 16:30 (Monday to Thursday) and 08:00 to 14:00 on Friday.

Expressions of interest must be delivered in a written form to the address below (in person, or by mail, or by fax, or by e-mail) by **February 12, 2020**.

**Project Management Team (PMT)**

**Social Assistance Modernization Project (SAMP)**

**Ministry of Health and Social Protection – 1<sup>st</sup> floor**

**Rruga e Kavajës, nr. 53, AL-1001, Tirana, ALBANIA**

**Att: Suzana Papadhopulli**

**e-mail: [samp.papadhopulli@gmail.com](mailto:samp.papadhopulli@gmail.com)**

### **Terms of Reference**

**"TA for training of social inspectors on improved DA inspection methodology and designing of technical specifications for additional module of DA MIS"**

**Ref. no. SAMP/CS/CQ/10-2019**

### **1. Background**

The Government of Albania has signed an additional loan agreement with the World Bank, on the Social Assistance Modernization Project (SAMP) which supports Albania's implementation reforms to improve the equity and efficiency of its social assistance programs.

The additional financing is expected to further contribute to improve the equity and efficiency of the social assistance system.

The *equity* goal is expected to be strengthened by:

- i. Scaling up of the new criteria to determine eligibility to the disability assistance based on the Social Model to at least half of the country's population;
- ii. Improving the accessibility of people with disability to State Social Services (SSS) regional centers where final eligibility decisions are determined;
- iii. Harmonizing the assessment and eligibility criteria across both non-contributory and contributory disability benefits;
- iv. Promoting the social inclusion of Ndhima Ekonomike Program NEP in the transition period of exiting the NE cash assistance program.

The *efficiency* goal is expected to be strengthened by:

- i. The production and use of automated MIS reports for DA performance management; and
- ii. The improved oversight and control of disability assistance benefits.

The Ministry of Health and Social Protection (MHSP) is the ministry responsible for the project implementation. The Department of Health and Social Protection Development Programs (HSPDPD) within MHSP is responsible for all the activities related to the implementation of reforms for both programs, Ndihma Ekonomike and Disability Assistance. In the framework of original SAMP project the MHSP has undertaken the reforming of the Disability Evaluation and Benefits system for the Albanian Non-Contributor (2nd group), to modernize disability criteria to fit into the broader context of social model, by revising assessment criteria to include functional and medical assessment, business procedures and institutional arrangements.

The objectives of the reform of Albania's disability assessment program are:

- i. To restructure the existing model of disability assessment and determination of related benefits, this relies solely on medical data, by introducing the bio-psycho-social approach of the ICF. This functional approach will take into account the interaction of health conditions (diseases, disorders and injuries) and contextual factors (environmental factors and personal factors) in the age appropriate daily activities;
- ii. To introduce, alongside assessment, the process of preparing a multidisciplinary individual support plan for people with disabilities to meet their medical, psychological, and social needs, and to reduce the barriers to social inclusion.
- iii. To reorganize the disability assessment administration to improve efficiency, increase accountability by establishing checks and balances, and reduce fraud.

The disability reform is planned to gradually scale up in a phased manner initially in Tirana region within 2019, and later on in other municipalities and regions, in Durres and Elbasan within 2020.

To strengthen the system for preventing, detecting and remedying fraud and errors and to improve efficiency for DA program a methodology of controlling the bio-psycho-social assessment of disability was approved on October 1st, 2019 by MHSP. Through the implementation of this new policy the capacity of social inspection is expected to be improved to enhance the accuracy of detection of error and fraud in DA program. The methodology is expected to be implemented along with the expanding of the reform in the three selected regions. Yet, the methodology needs refining by adding some important elements that are needed to be taken into account and included.

Furthermore, the social inspectors haven't been trained in the methodology. The training is highly needed, in order to enable inspectors to carry out social inspection campaigns.

For this purpose training of the DA inspectors in General Directory and SSS regional offices of Tirana, Durres and Elbasan on implementation of the approved DA inspection methodology should be conducted as soon as possible.

The efficiency of the mechanism for detecting and redressing the error and fraud could be greatly enhanced through the use of an automated information system, which would allow for the development of internal and external consistency checks of information, of risk-based profiling tools, and would improve the reporting of the campaign results and the follow-up processes (that would ensure that the recommendations of the inspection team are implemented).

To develop this module for social inspection campaigns the first step is to develop detailed technical specifications – software requirements specifications.

During the first two years of the pilot of the reform implementation, the Stage-1 MIS was developed and implemented in two pilot administrative units in Tirana. Implemented functions include modules for: managing the Registry (DA applicants); the ability to select of eligible beneficiaries; enrollment of beneficiaries; a payment process; and a reporting module for user-

generated reports. Lessons learned and adjustments from the first stage implementation shall be incorporated along with added functionality into an enhanced DA MIS developed in Stage-2. For the rollout in three selected regions during Stage-2 the DA MIS shall provide: Case Management module integrating various beneficiary services.

## **2. Objective**

The objectives of the consultancy are:

iii. Refine the methodology of controlling the bio-psycho-social assessment of disability with concrete elements in order the methodology to be a useful instrument that can be afterwards transformed into the DA MIS module, and (ii) train the social inspectors on the improved methodology;

iv. Develop the System Requirements Specifications (SRS) for two modules: Social inspection and case management modules which will be used as the primary guideline for the subsequent design and implementation of Stage-2 MIS software system, under a separate consulting effort;

## **3. Scope of work**

i. Improvement of the Social Inspection Methodology and Training for Social Inspectors

In December 2018, a draft methodology for the social inspection campaigns on DA was delivered by the company hired under the project. The Ministry has approved it at the beginning of October 2019. Although the methodology is a very good starting point, it still requires consistent improvements especially on the inspection instruments and procedures, in order to be an operational instrument that social inspectors can use effectively in their work. Specifically, the following methodology components need to be added or expanded:

a) The detailed methodology for identifying cases suspected of fraud and error. Considering that the DLI states that at least 55 percent of the suspected fraud and error have to be investigated, it is very important to make sure that the pool of cases to be part of the inspection campaigns is both manageable for the investigating team and relevant (in terms of size and probability of identifying the fraudulent/with errors cases); and that the inspectors are accountable for the cases that they select (the inclusion or exclusion of cases should be based on rules that can be tracked afterwards). This is why the methodology has to be further specified in this sense.<sup>1</sup>

b) The main categories of irregularities and, for each category, the exhaustive list of irregularities that the social inspectors should search for when they select a case to be inspected<sup>2</sup>. For each specific irregularity the following information should be provided: i. its definition, ii. the activity of the social worker to potentially identify it<sup>3</sup>, iii. the recommendation the social worker should make<sup>4</sup> for each type of irregularity.

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<sup>1</sup> For example, the DLI protocol mentions data cross-checks. Therefore, the methodology should describe: what data will be cross-checked, and the criteria based on which the suspicious cases will be identified. **The methodology** should also describe the way in which staff referrals will be tracked by the SI team to be investigated afterwards.

<sup>2</sup> For example, one category could be “Documents missing in the file” – and the potential irregularities should list all the documents that should be in the file so that the social inspector knows what to look for.

<sup>3</sup> For example, one irregularity could be that the information from the paper application is different from that entered in the system. To identify this, the social inspector would have to compare the application with the information from the MIS.

<sup>4</sup> For example, if the information from the application is different from that entered in the system, the social inspector may recommend: i. correcting the information in the system and continuing providing all the benefits as they are, if the level of disability and the benefits the person is eligible for do not change, ii. correcting the information in the system and providing the new benefits the persons is eligible for, if the level of disability and benefits the person is eligible for change, iii. correcting the information in the system, providing the new benefits and in addition recovering the additional amounts of money the beneficiary received but should not have (if the benefits should have been lower), etc. All the options the social inspector has should be explicit and he should make his decision in an objective and transparent way.

c) The instrument the social inspectors should use when inspecting specific cases that should guide them in the social inspection activity and make explicit exactly what steps they completed during the inspection process and the conclusions of inspecting each specific case.<sup>5</sup>

d) The instruments used to track the results of the social inspection campaigns (errors, recommendations, follow-up on the recommendations until the case is closed). The instrument can be tested as an excel file, but then could be fully implemented in the MIS.<sup>6</sup>

e) More specific formats of the reports summarizing the results of the social inspection campaigns (including structure of the tables).

Once the methodology is improved, a training module on how to use the methodology will need to be improved and updated and then approved by the HSPDPD in MoHSP, and the social inspectors under State Social Services (SSS) General Directorate and Regional Offices and the responsible staff in Ministry to be trained.

Under this phase the consultant will perform the following tasks:

- Review the methodology and enrich it with all concrete elements in order the methodology to be a useful instrument that can be afterwards transformed into the DA MIS module;

- Reflect accordingly the improvements in the developed training modules;

- Deliver training to the social inspectors in accordance with the improved modules, this will include:

- Developing training course program and materials for training of about 25 trainees (15 social inspectors from 3 pilot SSS Regional Offices (Tirana, Durres and Elbasan), 5 social inspectors from SSS General Directory, and 5 staff of responsible department in Ministry) on implementation of improved error, fraud, legal framework for DA program.

- Preparing a detailed training agenda for every day which will comprise the number of training sessions per day of no more than 20 trainees per class. Such detailed agenda must include the teaching hours designated for each of the modules with the time allocated to each of the thematic areas below, for a total of teaching hours. The exact number of teaching hours per session will be decided after the winning company conducts the preparation phase and presents an implementation plan.

ii. Development of Software Requirements Specifications (SRS) for a Case Management Module and for a Fraud and Error Investigations Module

The SRS shall provide a detailed definition of user and business requirements for Stage-2 MIS, including system and software requirements for added MIS functions.

The planned outcome of the software requirements specifications (SRS) is the identification of complete business, user and functional requirements, all encapsulated in the SRS, including process workflows, use case technical definitions, data definitions and modeling, internal and external interfaces of various types, and all needed elements that will facilitate and guide the development of added functionality.

Development of the SRS will use the general format provided on Attachment 1. The consultant will conduct the analysis and definition of business processes; define user detailed requirements; determine the various actors, roles and responsibilities; define data and process workflows; perform data analysis and modeling; define user and system interfaces and define the required system artifacts and components, among others. Business processes and specific user requirements shall be defined

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<sup>5</sup> The instrument could be a form/questionnaire in which the social inspector checks the activities that he/she performed and the types of irregularities he/she identifies.

<sup>6</sup> According to the protocol, the minimum information contained in this tool is that the pursued cases have to be broken down by the following categories: a) in process, b) closed with no further action required, c) closed and corrected with no sanction, d) closed and corrected with sanctions.

using the UML or similar methodology proposed by the consultant. Specific user and system requirements and all process and system design artifacts shall be defined through detailed Use Cases, and other UML diagrams.

a) **Case Management module integrating various user services** – Applicants and beneficiaries should be able to submit grievances and complaints through online system for resolution by MHSP. The MIS will provide online support to evaluation commission staff, program officers and fraud investigations to report, follow-up and make the necessary modifications and updates on beneficiary records. The system functions are supposed to include a module to address grievances and complaints raised by DA beneficiaries and applicants, including applicants that were denied eligibility. Other problems that should be covered by the module may concern service or payment delivery, issues with service from program officers as well as complaints in connection with program services. The DA MIS will provide an online function to capture the information and direct it through the proper channels and levels for evaluation and resolution, including:

- Grievances, complaints, appeals and other requests from beneficiaries to be addressed by program administrators at various levels;
- Use of a tracking function to report the status of complaint issue resolution, or in the case of a suspected fraud issue, the status of the respective follow-up, which is undertaken by a Social Inspector;
- Users include LGUs staff, regional and central SSS officers, social inspectors, central MHSP officers; and relevant external agencies involved in the grievance, complaints and appeals processes, or error and fraud investigation.

b) **Fraud and Error Investigations Module** - The second module within Integrated Case Management deals with an automated facility for use principally by NE Fraud Investigators, who will act upon program information produced through prior analysis, evaluation or business intelligence outputs, informing about possible cases of fraud for further investigation and analysis. Certain anomalies may also be attributed as errors which would be followed by some type of correction to beneficiary data. A risk based investigation system is designed and implemented with the support of MIS for NE.

The consultant is expected to undertake the following tasks during development of the SRS:

- Develop a project plan with detailed activities and tasks to undertake the project for developing the SRS for the NE MIS expanded to cover second-stage. The plan will include milestones weekly or biweekly milestones and/or progress meetings with the MSWY project Technical Working Group to report progress against the project plan, discuss and resolve issues and to deliver an updated SRS document in-progress.
- Review documentation related to the SAMP, the NE Program and the NE MIS requirements and available documentation. Other program information includes existing updated legislation as well as technical documentation for the NE MIS.
- Develop an understanding of: the existing ICT infrastructure already procured and installed to support the implementation of expanded NE MIS; the user community at national, regional and local levels; the organizational structure and roles and responsibilities of stakeholders, mainly the Ministry of Health and Social Protection and the State Social Service; other Ministries and government institutions that are involved or use the NE information and systems; as well as Local Government Units and social administrators as the direct users.
- Assemble the outputs and products of requirements analysis effort into a work SRS document for discussion with users and technical personnel from the Ministry at bi-weekly meetings.
- Based on the project plan, finalize the SRS product, present it to the TWG and obtain approval and sign-off to end and complete the consulting assignment.

#### 4. Deliverables and Reporting

| Report                 | Schedule                  | Description                                                                                                                                                                                                            | Approved by                                                                                                               |
|------------------------|---------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------|
| Inception report       | 2 weeks after start date  | Understanding of consulting assignment, consultant's responsibilities, approach and methodology, project plan, meetings, attendees, schedule, purpose, issues and other comments                                       | Department of Health and Social Protection Development Programs (DHSPDP)                                                  |
| 1 <sup>st</sup> Report | 6 weeks after start date  | Improved methodology of controlling the bio-psycho-social assessment of disability and updated training modules respectively                                                                                           | Department of Health and Social Protection Development Programs                                                           |
| 2 <sup>nd</sup> Report | 8 weeks after start date  | Training of social inspectors in SSS and ROs on the improved methodology                                                                                                                                               | Department of Health and Social Protection Development Programs                                                           |
|                        |                           | SRS work-in-progress, Draft Version 1.0<br>2 sections of the SRS document completed in draft form ready for review by the TWG. The consultant may proceed as deemed necessary to complete any two sections of the SRS. | Presented to TWG three days prior to meeting; reviewed and approved (or commented with changes) by TWG.                   |
| 3 <sup>rd</sup> Report | 10 weeks after start date | SRS work-in-progress, Draft Version 2.0<br>Remaining 2 sections of the SRS document completed in draft form ready for review by the TWG.                                                                               | Presented to TWG three days prior to meeting; reviewed and approved (or commented with changes) by TWG.                   |
| 4 <sup>th</sup> Report | 12 weeks after start      | SRS work-in-progress, Final Version<br>Completed SRS document ready for final review by the TWG. The consultant will have one week to incorporate any changes requested by the TWG.                                    | Presented to TWG three days prior to meeting; Final SRS will be reviewed and approved (or commented with changes) by TWG. |

#### 5. Qualifications of the Consultant

Interested Consultants should provide information demonstrating that they have the required qualifications and relevant experience as follows:

- i. At least 8 years of proven experience in the field of System Development Lifecycle with heavy emphasis on development of Software Requirements Specifications for large Management Information Systems and - experience of information systems engineering with analysis, design and implementation of MISs for large enterprises. (40 points);
- ii. The consultant must provide description of most relevant and similar work/ assignments/ contract, demonstrating appropriate skills in the above mentioned activities in the last three years (*name of contract, client, duration, budget, source of funding*) (40 points);
- iii. The consultant must provide description of most relevant and similar work/ assignments/ contract demonstrating familiarity with social protection programs and solid base understanding of procedural, institutional and social development in general (10 points);
- iv. Availability of qualified key staff within the company (10 points).

#### 6. Team composition

The consultant must have a team of experts with following profile and qualifications:

**Key expert 1- Social Expert**

- A university degree at Master's level relevant to this assignment; Social Sciences, or related fields;
- Not less than 7 years of professional working experience related to social sector;
- Experience in Albanian social services system, social assistance operational and administrative issues and social structures focused mainly in DA programs;
- Experience in providing expertise to government on development issues;
- Experience in inspection/audit procedures, assessments and evaluation in social field;
- Experience with preparation and deliverance of training modules and transfer know-how skills.
- Knowledge of English language.

**Key expert 2 – Social Expert/Trainer**

- University degree(s) in economics, law or social-related fields.
- Experience with preparation and deliverance of training modules and transfer know-how skills.
- At least three years of experience on teaching or conducting training as a teaching instrument in different sectors.
- Albanian language fluency.

**Key expert 3 - Senior Business Analyst**

- A university degree at the Master's level in computer science, information management, business administration, or in other closely related field;
- Minimum of 7 years of demonstrated specific experience in information system requirements analysis, business requirements, user requirements, software requirements, hardware requirements, interface requirements;
- Experience as MIS Business or Systems Analyst, Project Manager or Senior Engineer, responsible for business and organizational analysis, business process definition, and/or managing large size projects in government organizations, preferably in the social services area;
- Have developed Software Requirements Specifications using IEEE 830 Standard or similar methodology, documenting and delivering UML Use Cases and related artifacts such as class diagrams, sequence diagrams, etc.;
- Have produced system and software specifications for large size systems involving large databases handling several million records either in the public or private sector.
- Demonstrated ability for strategic thinking and analysis, coordination skills; He/She should obtain the ability to prioritize and perform demanding tasks against tight deadlines; Patience and experience in working with people with limited computer knowledge is required. Working experience in the social services area is considered as asset.

**Key expert 4 – Senior Data Analyst**

- A university degree at the Master's level in computer science, information management, business administration, or in other closely related field;
- Minimum of 5 years of demonstrated specific experience in data analysis, data modeling and management, information system requirements analysis, user requirements, software requirements, hardware requirements, interface requirements;
- Have produced system and software specifications for large size systems involving large databases handling several million records either in the public or private sector.
- Strong ability and disposition to work in a team environment, to communicate with various types of people across a government organization, including operations, mid and high level managers, as well as members of the technical team.

- Strong technical writing skills, ability to conduct interviews and meetings, to conceptualize, write and develop technical documents and to present information in a clear and concise manner.

#### **7. Schedule of payment**

The payment will be conducted according to the following schedule:

- 1<sup>st</sup> payment: 10% of contract price upon submission of inception report, acceptable by the MHSP/ DHSPDP;
- 2<sup>nd</sup> payment: 20% of contract price upon submission of 1<sup>st</sup> report, acceptable by the MHSP/ DHSPDP;
- 3<sup>rd</sup> payment: 30% of contract price upon submission of 2<sup>nd</sup> report, acceptable by the MHSP/ DHSPDP & TWG;
- 4<sup>th</sup> payment: 20% of contract price upon submission of 3<sup>rd</sup> report, acceptable by the MHSP/ TWG;
- 5<sup>th</sup> payment: 20% of contract price upon submission of 4<sup>th</sup> report, acceptable by the MHSP/ TWG.

#### **8. Duration of the assignment**

The assignment includes 96 man days in total for key experts. The consultant is expected to start the services on January 2020 until end of April 2020.

The local company will be hired under a Consultant Qualification Selection (CQS), in accordance with the procedures set out the World Bank Procurement Regulation for IPF Borrowers dated July 2016.

**Attachment** - Design the technical specifications for the development of second phase of DA MIS Software Requirements Specification (SRS) Guideline

Items that are intended to stay in as part of your document are in **bold**; explanatory comments are in italic text. Plain text is used where you might insert wording about your project.

The document in this file is an annotated outline for specifying software requirements, adapted from the **IEEE Guide to Software Requirements Specifications (Std 830)**.

**Design the technical specifications for the development of second phase of DA MIS will be required to follow this standard, with any modifications as needed, supplemented by a full definition of UML Use cases for all functional expanded DA MIS specifications.**

## **DESIGN THE TECHNICAL SPECIFICATIONS FOR THE DEVELOPMENT OF SECOND PHASE OF DA MIS**

### **Software Requirements Specification Document**

#### **Software Requirements Specification Document**

##### **Section 1. Introduction**

*The following subsections of the Software Requirements Specifications (SRS) document should provide an overview of the entire SRS.*

##### **1.1 Purpose**

*Identify the purpose of this SRS and its intended audience. In this subsection, describe the purpose of the particular SRS and specify the intended audience for the SRS.*

##### **1.2 Business Context**

*Provide an overview of the business organization sponsoring the development of the software application, including the mission statement and organizational objectives of the business unit.*

##### **1.3 Scope**

*1. In this subsection:*

2. Identify the software product(s) to be produced by name
3. Explain what the software product(s) will, and, if necessary, will not do
4. Describe the application of the software being specified, including relevant benefits, objectives, and goals
5. Be consistent with similar statements in higher-level specifications if they exist

#### **1.4 User Characteristics**

Identify each type of user of the software by function, location, and type of device. Specify the number of users in each group and the nature of their use of the software. Characteristics of the users of the software product will affect the specific requirements. Many people interact with software during the operation and maintenance phases of the software life cycle. Some of these people are users, operators, and maintenance and systems personnel. Certain characteristics of these people, such as educational level, experience, and technical expertise may impose important constraints on the software's operating environment.

#### **1.5 Definitions, Acronyms, and Abbreviations.**

Provide the definitions of all terms, acronyms, and abbreviations required to properly interpret the SRS. This information may be provided by reference to one or more appendices in the SRS or by reference to documents. This information may be provided by reference to an Appendix.

#### **1.6 References**

In this subsection:

1. Provide a complete list of all documents referenced elsewhere in the SRS
2. Identify each document by title, report number (if applicable), date, and publishing organization
3. Specify the sources from which the references can be obtained.

This information can be provided by reference to an appendix or to another document.

#### **1.7 Document Organization**

In this subsection:

1. Describe what the rest of the SRS contains
2. Explain how the SRS is organized

### **Section 2. Requirements**

#### **2.1 Introduction**

This section contains all the software requirements at a level of detail sufficient to enable designers to design a system to satisfy those requirements, and testers to test that the system satisfies those requirements. Throughout this section, every stated requirement should be externally perceivable by users, operators, or other external systems. These requirements should include at a minimum a description of every input (stimulus) into the system, every output (response) from the system and all functions performed by the system in response to an input or in support of an output. The following principles apply:

1. Specific requirements should be stated with all the characteristics of a good SRS
  - Correct
  - Unambiguous
  - Complete
  - Consistent
  - Ranked for importance and/or stability
  - Verifiable
  - Modifiable
  - Traceable
2. Specific requirements should be cross-referenced to earlier documents that relate
3. All requirements should be uniquely identifiable
4. Careful attention should be given to organizing the requirements to maximize readability

Before examining specific ways of organizing the requirements it is helpful to understand the various items that comprise requirements as described in the following subclasses.

## **2.2 Business Requirements**

*Describe all requirements from a business perspective. Business requirements are the parts of the fully defined business process that will be automated by the software application. Business requirements may be defined as use cases.*

## **2.3 Functional Requirements**

*Customize this subsection to contain the subsections necessary to comprehensively define the fundamental actions that must take place within the software to accept and process the inputs and to process and generate the outputs.*

*Fundamental actions in functional requirements include:*

- Validity checks on the inputs*
- Exact sequence of operations*
- Responses to abnormal situations, including overflow and communication facilities*
- Effect of parameters*
- Relationship of outputs to inputs, including*
- Input/output sequences*
- Formulas for input to output conversion*
- Definitions of the responses of the software to all realizable classes of input data in all realizable classes of situations*

*Functional requirements should include specific requirements for business rules. Business rules describe and document the steps in a business process.*

*It may be appropriate to partition the functional requirements into sub-functions or sub-processes. This does not imply that the architecture or software design will also be partitioned in that way.*

*The two common means of specifying functional requirements are functional decomposition and use cases. For this project it is required to employ use cases.*

### **2.3.1 XU Use Case Y**

*When use cases are used as the means of specifying the functional requirements provide a 3.2.xu subsection for each use case. Each 3.2.xu subsection should be labeled and titled appropriately for a specific use case, where xu is the appropriate sequential subsection number and Y is the name of the specific use case.*

*Within each use case subsection, specify the use case information, including the actor, pre-conditions, post-conditions, scenarios, and alternate scenarios.*

## **2.4 Logical Data Requirements**

*This section specifies the logical requirements for any information that is to be placed into a database. This may include:*

- Types of information used by various functions*
- Frequency of use*
- Accessing capabilities*
- Data entities and their relationships*
- Integrity constraints*
- Data retention requirements*

## **2.5 User Requirements**

*Describe user requirements for the software application. User requirements capture the intended behavior of the human interface for the application. For example, if the user operates through a display terminal, specify the required screen content, content of any reports or menus, and relative timing of inputs and outputs. User requirements may include example screen or report formats as prototypes to illustrate requirements.*

## **2.6 Information Management Requirements**

*Specify requirements for managing the creation, capture, organization, maintenance, use, protection, and disposition of information in accordance with applicable laws, regulations, policies, and standards.*

## **2.7 Performance Requirements**

*This subsection specifies both the static and the dynamic numerical requirements placed on the software or on human interaction with the software, as a whole. Static numerical requirements may include:*

- The number of terminals to be supported*
- The number of simultaneous users to be supported*
- Amount and type of information to be handled*

*Static numerical requirements are sometimes identified under a separate section entitled capacity.*

*Dynamic numerical requirements may include, for example, the numbers of transactions and tasks and the amount of data to be processed within certain time periods for both normal and peak workload conditions.*

*All of these requirements should be stated in measurable terms.*

*For example,*

*95% of the transactions shall be processed in less than 1 second rather than,*

*An operator shall not have to wait for the transaction to complete.*

*(Note: Numerical limits applied to one specific function are normally specified as part of the processing subparagraph description of that function.)*

## **2.8 Quality Requirements**

*Describe requirements for the quality characteristics of the software. Specify the requirements in measurable and verifiable terms. Describe any trade-offs between the characteristics (e.g., security versus portability). Definitions of the quality characteristics include:*

*Correctness – extent to which program satisfies specifications and fulfills user's mission objectives*

*Efficiency – amount of computing resources and code required to perform function*

*Flexibility – effort needed to modify operational program*

*Integrity/ Security – extent to which access to software or data by unauthorized people can be controlled.*

*Security requirements relate to both the facility that houses the system and operational security requirements. Examples of security requirements might be to specify the security and privacy requirements, including access limitations to the software, such as existence of log-on procedures and passwords, and of data protection and recovery methods. This could include the factors that would protect the software from accidental or malicious access, use, modification, destruction, or disclosure.*

*Maintainability – effort required to locate and correct an error during operation. Maintainability requirements apply to maintenance in the planned maintenance and support environments. Examples of quantitative maintainability requirements are time (e.g., mean and maximum downtime, reaction time, turnaround time, mean and maximum times to repair, mean time between maintenance actions), rate (e.g., maintenance staff hours per specific maintenance action, operational ready rate, maintenance time per operating hour, frequency of preventative maintenance), maintenance complexity (e.g., number of people and skill levels, variety of support equipment), and maintenance action indices (e.g., maintenance costs per operating hour, staff hours per overhaul).*

*Portability – effort needed to transfer from one hardware or software environment to another*

*Reliability – extent to which the software performs with required precision*

*Reusability – extent to which software and associated artifacts can be reused in another application*

*Testability – effort needed to test to ensure that the software performs as intended*

*Usability – effort required to learn, operate, prepare input, and interpret output. Usability requirements include any special or unique requirements that identify and define human-factor considerations and constraints (e.g., design space limits, climatic limits, eye movement, reach, ergonomics, cognitive limits, and usability) that affect operation of the software. Examples include those specific areas, stations, or equipment that require concentrated human engineering attention due to the sensitivity of the operation or criticality of the task (e.g., those areas where the effects of human error would be particularly serious).*

## **2.9 Interfaces**

*Describe the logical characteristics of each interface between the application and other hardware, software, and communication protocols. Include within the description for each interface the:*

*It contains both content and format as follows:*

- *Name of item*
- *Description of purpose*
- *Source of input or destination of output*
- *Valid range, accuracy and/ or tolerance*
- *Units of measure*
- *Timing*
- *Relationships to other inputs/ outputs*
- *Screen formats/ organization*
- *Window formats/ organization*
- *Data formats*
- *Command formats*
- *End messages*

*List each system interface and identify the functionality of the software to accomplish the system requirement and the interface description to match the system. Specify:*

1. *The logical characteristics of each interface between the software product and its users*
2. *All the aspects of optimizing the interface with the person who must use the system*

#### **2.9.1 Hardware Interfaces**

*Specify the logical characteristics of each interface between the software product and the hardware components of the system. This includes configuration characteristics. It also covers such matters as what devices are to be supported, how they are to be supported and protocols.*

#### **2.9.2 Software Interfaces**

*Specify the use of other required software products and interfaces with other application systems. For each required software product, include:*

1. *Name*
2. *Mnemonic*
3. *Specification number*
4. *Version number*
5. *Source*

*For each interface, provide:*

1. *Discussion of the purpose of the interfacing software as related to this software product*
2. *Definition of the interface in terms of message content and format*

#### **2.9.3 Communications Interfaces**

*Specify the various interfaces to communications such as local network protocols, etc.*

#### **2.9.4 Memory Constraints**

*Specify any applicable characteristics and limits on primary and secondary memory.*

### **Section 3. SRS Product Description**

*Describe the general factors that affect the product and its requirements. This section does not state specific requirements. Instead, it provides a background for those requirements, which are defined in section 3, and makes them easier to understand.*

#### **3.1 Product Perspective**

*Put the product into perspective with other related products. If the product is independent and totally self-contained, it should be so stated here. If the SRS defines a product that is a component of a larger system, as frequently occurs, then this subsection relates the requirements of the larger system to functionality of the software and identifies interfaces between that system and the software.*

*A block diagram showing the major components of the larger system, interconnections, and external interfaces can be helpful. The following subsections describe how the software operates inside various constraints.*

### **3.1.1 Operations**

*Specify the normal and special operations required by the user such as:*

- 1. The various modes of operations in the user organization*
- 2. Periods of interactive operations and periods of unattended operations*
- 3. Data processing support functions*
- 4. Backup and recovery operations*

*(Note: This is sometimes specified as part of the User Interfaces section.)*

### **3.1.2 Site Adaptation Requirements**

*In this section:*

- 1. Define the requirements for any data or initialization sequences that are specific to a given site, mission, or operational mode*
- 2. Specify the site or mission-related features that should be modified to adapt the software to a particular installation*

## **3.2 Assumptions, Dependencies and Constraints**

### **3.2.1 Assumptions**

*Describe each assumption that can affect the requirements specified in the SRS. Assumptions are factors that are believed to be true during the life cycle of the project that, if changed, may affect the project outcomes negatively including, but not limited to, end-user characteristics, known technology infrastructure, resource availability, and funding availability.*

### **3.2.2 Dependencies**

*Describe each dependency that can affect the requirements specified in the SRS. Dependencies are outside of project scope and control and must remain true for the project to succeed. For example, a dependency might be that an application relies on a different application to provide specific data or that an interface to a third-party application requires the purchase of an application programming interface (API).*

### **3.2.3 Constraints**

*Provide a general description of any other items that will limit the developer's options. These can include:*

- 1. Regulatory policies*
- 2. Hardware limitations (for example, signal timing requirements)*
- 3. Interface to other applications*
- 4. Parallel operation*
- 5. Audit functions*
- 6. Control functions*
- 7. Higher-order language requirements*
- 8. Signal handshake protocols (for example, XON-XOFF, ACK-NACK)*
- 9. Reliability requirements*
- 10. Criticality of the application*
- 11. Safety and security considerations*

## **3.3 Major System Functions**

*Provide a summary of the major functions that the software will perform. Sometimes the function summary that is necessary for this part can be taken directly from the section of the higher-level specification (if one exists) that allocates particular functions to the software product.*

*For clarity:*

- 1. The functions should be organized in a way that makes the list of functions understandable to the customer or to anyone else reading the document for the first time.*

2. Textual or graphic methods can be used to show the different functions and their relationships. Such a diagram is not intended to show a design of a product but simply shows the logical relationships among variables.

#### 3.3.1 User Characteristics

Describe those general characteristics of the intended users of the product including educational level, experience, and technical expertise. Do not state specific requirements but rather provide the reasons why certain specific requirements are later specified in section 3.

#### 3.3.2 Standards Compliance

Specify the requirements derived from existing standards or regulations. They might include:

1. Report format
2. Data naming
3. Accounting procedures
4. Audit Tracing

For example, this could specify the requirement for software to trace processing activity. Such traces are needed for some applications to meet minimum regulatory or financial standards. An audit trace requirement may, for example, state that all changes to a payroll database must be recorded in a trace file with before and after values.

### 3.4 Software System Attributes

There are a number of attributes of software that can serve as requirements. It is important that required attributes be specified so that their achievement can be objectively verified. The following items provide a partial list of examples.

#### 3.4.1 Reliability

Specify the factors required to establish the required reliability of the software system at time of delivery.

#### 3.4.2 Availability

Specify the factors required to guarantee a defined availability level for the entire system such as checkpoint, recovery, and restart.

#### 3.4.3 Security

Specify the factors that would protect the software from accidental or malicious access, use, modification, destruction, or disclosure. Specific requirements in this area could include the need to:

- Utilize certain cryptographic techniques
- Keep specific log or history data sets
- Assign certain functions to different modules
- Restrict communications between some areas of the program
- Check data integrity for critical variables

#### 3.4.4 Maintainability

Specify attributes of software that relate to the ease of maintenance of the software itself. There may be some requirement for certain modularity, interfaces, complexity, etc. Requirements should not be placed here just because they are thought to be good design practices.

#### 3.4.5 Portability

Specify attributes of software that relate to the ease of porting the software to other host machines and/or operating systems. This may include:

- Percentage of components with host-dependent code
- Percentage of code that is host dependent
- Use of a proven portable language
- Use of a particular compiler or language subset
- Use of a particular operating system

Once the relevant characteristics are selected, a subsection should be written for each, explaining the rationale for including this characteristic and how it will be tested and measured. A chart like this might be used to identify the key characteristics (rating them High or Medium), then identifying which are preferred when trading off design or implementation decisions (with the ID of the preferred one indicated in the chart to the right).

| ID | Characteristic     | H/M/L | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 |
|----|--------------------|-------|---|---|---|---|---|---|---|---|---|----|----|----|
| 1  | Correctness        |       |   |   |   |   |   |   |   |   |   |    |    |    |
| 2  | Efficiency         |       |   |   |   |   |   |   |   |   |   |    |    |    |
| 3  | Flexibility        |       |   |   |   |   |   |   |   |   |   |    |    |    |
| 4  | Integrity/Security |       |   |   |   |   |   |   |   |   |   |    |    |    |
| 5  | Interoperability   |       |   |   |   |   |   |   |   |   |   |    |    |    |
| 6  | Maintainability    |       |   |   |   |   |   |   |   |   |   |    |    |    |
| 7  | Portability        |       |   |   |   |   |   |   |   |   |   |    |    |    |
| 8  | Reliability        |       |   |   |   |   |   |   |   |   |   |    |    |    |
| 9  | Reusability        |       |   |   |   |   |   |   |   |   |   |    |    |    |
| 10 | Testability        |       |   |   |   |   |   |   |   |   |   |    |    |    |
| 11 | Usability          |       |   |   |   |   |   |   |   |   |   |    |    |    |
| 12 | Availability       |       |   |   |   |   |   |   |   |   |   |    |    |    |

*Definitions of the quality characteristics not defined in the paragraphs above follow.*

- *Correctness* - extent to which program satisfies specifications, fulfills user's mission objectives
- *Efficiency* - amount of computing resources and code required to perform function
- *Flexibility* - effort needed to modify operational program
- *Interoperability* - effort needed to couple one system with another
- *Reliability* - extent to which program performs with required precision
- *Reusability* - extent to which it can be reused in another application
- *Testability* - effort needed to test to ensure performs as intended
- *Usability* - effort required to learn, operate, prepare input, and interpret output

### **3.5 Requirements Traceability Matrix**

*In this section, provide reference to the location of the Requirements Traceability Matrix (RTM) that indicates traceability from the system requirements documented in the System Requirements Specification (SyRS) to the design elements documented in the System Design Description (SyDD) to the software requirements documented in the Software Requirements Specification (SRS).*

*The RTM is initiated in the SyRS and is updated appropriately during the life of the project to indicate traceability to the design elements documented in the SyDD, the software requirements documented in the SRS, and the design elements documented in the SDD. The completed RTM assures that every requirement has been addressed in the design and that every design element addresses a requirement. The RTM also provides the necessary traceability for integration, acceptance, regression, and performance testing.*

*The Requirements Traceability Matrix in the SRS should:*

- Contain the columns used to illustrate traceability of the system requirements to the system design elements, software requirements, and software design elements
- Contain the columns necessary to illustrate traceability for integration, acceptance, regression, and performance testing
- Be populated with all requirements documented in the SyRS
- Be populated with all design elements documented in the SyDD
- Be populated with all requirements documented in the SRS
- Indicate traceability from the system requirements documented in the SyRS to the design elements documented in the SyDD
- Indicate traceability from design elements documented in the SyDD to the software requirements documented in the SRS
- Indicate the source or origin of each requirement

A sample RTM template is provided as an additional tool in the Appendix of the System Requirements Specification Template Instructions.

## **Section 4. Organizing the Specific Requirements**

For anything but trivial systems the detailed requirements tend to be extensive. For this reason, it is recommended that careful consideration be given to organizing these in a manner optimal for understanding. There is no one optimal organization for all systems. Different classes of systems lend themselves to different organizations of requirements in section 3. Some of these organizations are described in the following subclasses.

### **4.1 System Mode**

Some systems behave quite differently depending on the mode of operation. When organizing by mode there are two possible outlines. The choice depends on whether interfaces and performance are dependent on mode.

#### **4.2 User Class**

Some systems provide different sets of functions to different classes of users.

#### **4.3 Objects**

Objects are real-world entities that have a counterpart within the system. Associated with each object is a set of attributes and functions. These functions are also called services, methods, or processes. Note that sets of objects may share attributes and services. These are grouped together as classes.

#### **4.4 Feature**

A feature is an externally desired service by the system that may require a sequence of inputs to effect the desired result. Each feature is generally described in as sequence of stimulus-response pairs.

#### **4.5 Stimulus**

Some systems can be best organized by describing their functions in terms of stimuli.

#### **4.6 Response**

Some systems can be best organized by describing their functions in support of the generation of a response.

#### **4.7 Functional Hierarchy**

When none of the above organizational schemes prove helpful, the overall functionality can be organized into a hierarchy of functions organized by either common inputs, common outputs, or common internal data access. Data flow diagrams and data dictionaries can be used to show the relationships between and among the functions and data.